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INFORMATION REPORT

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COUNTRY East Germany

REPORT

SUBJECT Development of Geiger-Mueller Counters at VEB Transformatoren - und Roentgenwerk, Dresden (TRARO)

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1. In 1954, the development of various types of Geiger-Mueller radiation counters was completed by the Radiation Measurement Sub-Section of the X-Ray, Radiation and Electrical Therapy Section of VEB Transformatoren- und Roentgenwerk Dresden. This sub-section is headed by Eng. Frommhold (fnu). During 1954, 90 Geiger-Mueller counters of all types were delivered to the USSR. In 1955, 600 counters are to be delivered there.

25X1

2. The following are the types of Geiger-Mueller counters so far developed by the Dresden enterprise:

a. Type Series IA: This series consists of the types IA1, IA10, IA100, and IA300. The types IA1, IA10, and IA100 are used for counting X-rays and gamma rays from 20 keV to 3 MeV and for hard beta rays over 1 MeV. The type IA300 is used for counting X-rays and gamma rays from 50 keV to 1 MeV. The tubes are made of glass with a small potassium content and are provided with a graphite layer cathode. The filling is self-extinguishing (Selbstloeschende Fuellung). The following table lists the technical data of the counter types of this series:

Type	IA1	IA10	IA100	IA300
Effective volume in cubic centimeters, about	1	10	100	300
Total length in millimeters	115	160	270	475
Largest diameter in millimeters	20	20	25	40
Wall strength in mg/cm ² , about	35	35	35	140
Input voltage in volts	1,000	1,000	1,000	1,000
Minimum plateau length in volts	160	200	240	220
Plateau rise in % per 100 volts	Less than 10	Less than 8	Less than 5	Less than 5
Dead time in micro-seconds	40	60	160	200
Zero effect in impulses per minute, about	20 ⁸	100 ⁸	275 ⁸	650 ⁸
Minimum life term in impulses	10 ⁸	10 ⁸	10 ⁸	10 ⁸

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-2-

- b. Type Series IB: This series consists of types IB1, IB10, and IB100. All three types can be used for the counting of X-rays and gamma rays over 20 KeV and hard beta rays over 1 MeV. They are particularly sensitive to X Rays from 60 keV to 120 keV. The counter tube is made of glass with a small potassium content and is provided with a cathode of precious metal. The filling is self-extinguishing. The following table lists the technical data of the counter types of this series:

Type	IB1	IB10	IB100
Effective volume in cubic centimeters, about	1	10	100
Total length in millimeters	115	160	270
Largest diameter in millimeters	20	20	25
Wall strength in mg/cm ² , about	35	35	35
Input voltage in volts	1,000	1,000	1,000
Minimum plateau length in volts	160	200	240
Plateau rise in % per 100 volts	Less than 20	Less than 8	Less than 5
Dead time in micro-seconds	40	100	160
Zero effect in impulses per minute, about	20 ⁸	100 ⁸	275 ⁸
Minimum life term in impulses	10 ⁸	10 ⁸	10 ⁸

- c. Type Series IC: This series consists of types IC10, IC100, and IC300. Types IC10 and IC100 can be used for counting weak X rays and gamma rays from 20 keV to 3 MeV and for hard beta rays over 1 MeV. Type IC300 can be used for weak X rays and gamma rays from 50 keV to 3 MeV, and in particular for cosmic radiation. The counter tube is made of glass with a small potassium content and is provided with an outside layer cathode (Maze Counter). The filling is self-extinguishing. The following table lists the technical data of the counter types of this series:

Type	IC10	IC100	IC300
Effective volume in cubic centimeters, about	10	100	300
Total length in millimeters	160	270	475
Largest diameter in millimeters	20	25	40
Wall strength in mg/cm ² , about	35	35	140
Input voltage in volts	1,000	1,000	1,000
Minimum plateau length in volts	300	400	400
Plateau rise in % per 100 volts	Less than 8	Less than 5	Less than 5
Dead time in micro-seconds			
Zero effect in impulses per minute, about	70 ⁸	200 ⁸	650 ⁸
Minimum life term in impulses	10 ⁸	10 ⁸	10 ⁸

- d. Type Series IIB: This series consists of types IIB3, IIB10, IIB100. They can be used for counting X-rays and gamma rays from 50 keV to 3 MeV. The counter tube is made of glass with a small potassium content and is provided with a copper cathode 0.1 millimeter thick and nickelized by galvanization. The filling is self-extinguishing. The following table lists the technical data of the counter types of this series:

Type	IIB3	IIB10	IIB100
Effective volume in cubic centimeters, about	3	10	100
Total length in millimeters	115	145	270
Largest diameter in millimeters	20	25	30
Input voltage in volts	1,000	1,000	1,000
Minimum plateau length in volts	160	200	240
Plateau rise in % per 100 volts	Less than 10	Less than 8	Less than 5
Dead time in micro-seconds	50	100	160
Zero effect in impulses per minute, about	20 ⁸	100 ⁸	200 ⁸
Minimum life term in impulses	10 ⁸	10 ⁸	10 ⁸

SECRET

SECRET
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25X1

-3-

- e. **Type Series IIC:** This series consists of types IIC100 and IIC300. These types are used for counting hard gamma rays and cosmic rays. The counter tubes are made of glass with a small potassium content and are provided with a copper cathode 0.3 millimeters thick which is nickelized through galvanization. The filling is self-extinguishing. The following table lists the technical data of the counter types of this series:

Type	IIC100	IIC300
Effective volume in cubic cm., about	100	300
Total length in millimeters	270	475
Largest diameter in millimeters	30	40
Input voltage in volts	1,000	1,000
Minimum plateau length in volts	250	250
Plateau rise in % per 100 volts	Less than 5	Less than 5
Dead time in micro-seconds	160	200
Zero effect in impulses per minute, about	160 ⁸	400 ⁸
Minimum life term in impulses	10 ⁸	10 ⁸

- f. **Type Series IV:** This series consists of the following types: IVA10, IVC10 and IVE10. They can be used as interference counters for X rays with wave lengths from 1 to 2 angstrom units. The counter tubes are made of glass with a small potassium content and are provided with a radiation window. The filling is self-extinguishing. The window material of type IVA10 is Lindemann glass, that of IVC10 is silicate glass and that of IVE10 is mica. The window diameter is 10 millimeters for all three types. The following table lists the technical data of the counter types of this series:

Type	IVA10	IVC10	IVE10
Effective volume in cubic cm., about	10	10	10
Total length in millimeters	150	165	150
Largest diameter in millimeters	25	25	25
Wall strength in mg/cm ² , about	250	20	50
Input voltage in volts	1,000	1,000	1,000
Minimum plateau length in volts	250	250	250
Plateau rise in % per 100 volts	Less than 5	Less than 5	Less than 5
Dead time in micro-seconds	100	100	100
Zero effect in impulses per minute, about	100 ⁸	100 ⁸	100 ⁸
Minimum life term in impulses	10 ⁸	10 ⁸	10 ⁸

3. The appended sketch shows sockelung diagrams of the counter tubes with the essential dimensions indicated in millimeters. "B" is the diagram for types IA300, IC300 and IIC300. "A" is the diagram for all other types mentioned in this report.

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25X1

- 4 -

Diagrams of Geiger-Mueller Counters

(All dimensions in millimeters)

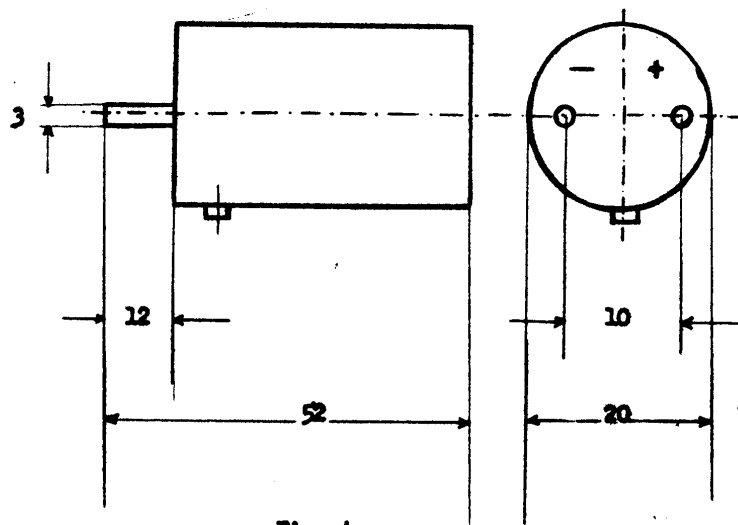


Fig. A

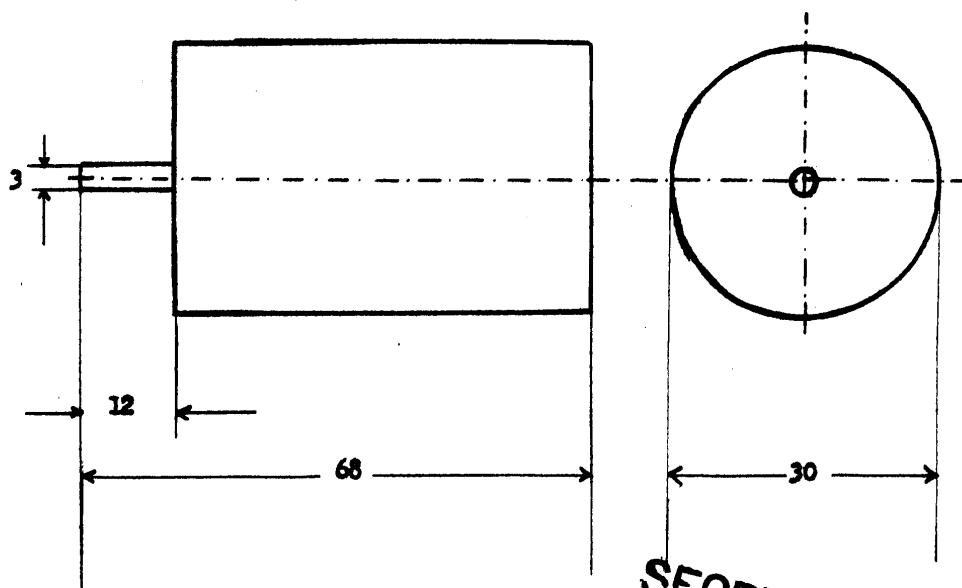


Fig. B

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